

CLAIMS

5 1. An offshore installation for transferring a liquefied gas, especially liquefied natural gas, of the type that includes a first tank (18) and is designed to transfer liquefied gas from the first tank (18) to a second tank, which is a tank (6) on the surface,
10 furthermore comprising a transfer line (28) suitable for being connected to said tanks (6, 18), the two tanks being far apart during transfer of the liquefied gas, the transfer line (28) being submerged in the water, characterized in that the installation comprises
15 a first terminal (8) carrying the first tank (18) and a second terminal (22), especially a loading buoy, which is far apart from said first terminal (8), in that the transfer line (28) extends between the two terminals (8, 22), in that the first tank is a tank (18) on the
20 surface, in that the transfer line (28) comprises a substantially horizontal rigid main section (32) located in a region of the water layer in which the dynamic forces are low and substantially vertical flexible sections (30, 34) which link the ends of the
25 main section (32) to the terminals (18, 22) and ensure continuity of liquid gas transport and take up of the dynamic forces, in that the main section (32) and the flexible sections (30, 34) comprise an internal transport hose (40, 42, 68) and an external jacket (36,
30 38, 66) which define an annular space (44, 46, 49), in that the annular space (44, 46, 69) extends over the entire length of the transfer line (28), in that the annular space (44, 46, 69) is thermally insulated by thermal insulation means, and in that it furthermore
35 includes means for filling the annular space (44, 46, 69) with inert gas, especially nitrogen.

2. The installation as claimed in claim 1, characterized in that the rigid main section (32) comprises a bundle of hoses placed parallel to one another.

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3. The installation as claimed in claim 2, characterized in that the bundle of hoses includes a hose for returning gas in the gaseous state, which will flow from said second tank (6) back to said first tank (18).

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4. The installation as claimed in any one of claims 1 to 3, characterized in that it includes verification means (90, 92) designed to check the sealing of the jacket (36, 38, 66) and/or the hose (40, 42, 68).

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5. The installation as claimed in claim 4, characterized in that the verification means comprise a sensor (90) suitable for detecting the pressure variation within the annular space (44, 46, 69) and suitable for delivering a warning signal when the pressure variation lies above a predetermined value.

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6. The installation as claimed in claim 4 or 5, characterized in that the verification means comprise a sensor suitable for detecting the presence in the annular space (44, 46, 69) of at least one of the components of the liquefied gas that has to be conveyed by the hose (40, 42, 68), especially CH₄, or designed to detect the amount of inert gas in the annular space (44, 46, 69).

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7. The installation as claimed in any one of claims 1 to 6, characterized in that the rigid main section (32) is located in a region of the water layer in which the maximum speed of the water current is below 1 m/s, preferably below 0.5 m/s.

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8. The installation as claimed in any one of claims 1 to 7, characterized in that said first and said second tanks (6, 18) are spaced apart by a distance greater than 300 meters and preferably of the order of 1
5 nautical mile during transfer of the liquefied gas.

9. The installation as claimed in any one of the preceding claims, characterized in that said second terminal (22) is designed to link the transfer line
10 (28) to a loading hose (24) equipped with means (25) for connection to the second tank (6) carried by a ship.

10. The installation as claimed in any one of the preceding claims, characterized in that the annular
15 space (44, 46, 69) is connected to evacuation means (86) designed to keep this space (44, 46, 69) at a pressure below atmospheric pressure, especially at a pressure below 100 mbar and in particular at a pressure
20 of approximately 30 mbar.

11. The installation as claimed in any one of the preceding claims, characterized in that the internal
hose (68) of the main section (32) comprises a rigid
25 metal part (74), which includes, at at least one of its ends, a compensating bellows (76, 78), and in that the variation in length permitted by the bellows (76, 78) is at least the variation in length of the rigid part (74) under a variation in temperature between the water
30 temperature and the temperature of the liquefied gas.

12. The installation as claimed in any one of the preceding claims, characterized in that the rigid main
section (32) is suspended from a balancing body (94)
35 that is designed to provide it with buoyancy or with ballast.

13. The installation as claimed in any one of the preceding claims, characterized in that the rigid main section (32) is suspended from the two terminals (8, 22) or anchored on the seabed by a mooring line.

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14. The use of an installation as claimed in any one of the preceding claims for transferring liquefied gas from a first tank (18) to a second tank (6).